

CLAIMS

1. A method of manufacturing a tire having, on at least one side wall, a first color side wall rubber expressed as characters or lines, second color side wall rubbers, each of which is located on both sides in the radial direction of this first color side wall rubber, and a second color cover rubber covering the first color side wall rubber portion other than the characters or lines, wherein:

each of the second color side wall rubber and the first color side wall rubber is stamped on the side face of a carcass member formed in the toroidal state by winding a continuous second color rubber ribbon and a continuous first color rubber ribbon in plural turns and then, said cover rubber is stamped on the outside of these side wall rubbers by winding a rubber sheet in one turn in the annular state so as to shape a green tire, and

in vulcanizing the green tire, using a mold having a recess portion corresponding to the characters or lines, a projecting portion corresponding to this recess portion is formed on the tire, and after vulcanization, the projecting portion on the tire is buffed to have the first color characters or lines to be expressed.

2. A method of manufacturing a tire according to claim 1, wherein the leading end of a long rubber sheet arranged on a tangent of an annular band on the side wall rubber to be a stamping face of said cover rubber is held, and this leading end is moved and pressed onto the annular band and then, the rubber sheet is stamped onto the annular band by rotating the carcass member around its central axis while applying a tension to this rubber sheet, the rotation of the carcass member is stopped and then, an unstamped portion of the long rubber sheet is cut off and the unstamped portion to be the rear end of the rubber sheet on the annular band is pressed onto the annular band to stamp the cover rubber.

3. A method of manufacturing a tire according to claim 2, wherein, in cutting the long rubber sheet extending on said tangent to form the leading end and the rear end of said rubber sheet, both the cut-off faces of the leading end and the rear end of the rubber sheet are inclined with respect to the width direction of the long sheet, and the long rubber sheet is cut off so that, in the

cut-off face of the rubber sheet leading end, the end in the width direction to be the outside in the radial direction on the annular band is located closer to the front in the traveling direction of the long sheet than the end in the width direction to be the inside in the radial direction, while in the cut-off face of the rubber sheet rear end, the end in the width direction to be the outside in the radial direction on the annular band is located closer to the rear in the traveling direction of the long sheet than the end in the width direction to be the inside in the radial direction, and

a rubber sheet portion in the shape of a trapezoid or a triangle defined by the cut-off face of the rear end of the rubber sheet stamped first and the cut-off face of the leading end of the rubber sheet to be stamped next is removed.

4. A method of manufacturing a tire according to claim 1, wherein, in stamping said cover rubber onto the annular band on the side wall to be the stamping face, the rubber sheet extruded through a die is passed through a gap formed by arranging large-diameter sides and small-diameter sides of a pair of truncated conical rollers opposite to each other and rolled, and immediately after rolling of this rubber sheet, the rubber sheet is stamped in the annular state so that the rubber sheet side rolled by the large-diameter side of truncated conical roller is made to correspond with the outside in the radial direction of the annular band while the side rolled by the small-diameter side of truncated conical roller is made to correspond with the inside in the annular band.

5. A method of manufacturing a tire according to claim 4, wherein said gap is made uniform over the width direction when rolling the rubber sheet.

6. A method of manufacturing a tire according to claim 4 or 5, wherein after the rolled rubber sheet is wound around one of the truncated conical rollers by a predetermined angle, the rubber sheet is transferred from this truncated conical roller to the annular band while pressing the wound rubber sheet onto the side face of the carcass member.

7. A method of manufacturing a tire according to any of claims 4 to 6, wherein the rubber sheet wound around said one of the truncated conical rollers is cut off in the width direction on this truncated conical roller.

8. A cover rubber stamping device adapted for carrying out the method of manufacturing a tire according to claim 2 or 3, comprising a rubber sheet delivery means for delivering said long rubber sheet, a tensioner for applying a tension to the delivered long rubber sheet, a leading-end holding part for holding the leading end of the long rubber sheet, a leading-end holding part displacing means for displacing this leading-end holding part back and forth between a holding start position and a holding end position, a pressing roller for pressing the rubber sheet across the leading end to the rear end onto said annular band, a rubber sheet guide mechanism for regulating an entry position of the long rubber sheet into the annular band, and a cutter for forming the leading end and the rear end of the rubber sheet by cutting said long sheet.

9. A cover rubber stamping device according to claim 8, wherein said leading end holding part is to hold the rubber sheet leading end by vacuum adsorption.

10. A cover rubber stamping device according to claim 8 or 9, wherein double blades inclined in reverse orientation from each other with respect to the face crossing the long rubber sheet delivery direction are disposed on said cutter, and anvils for receiving these blades and a cutter displacing means for displacing the cutter in the direction crossing the rubber sheet face arranged on the anvil are provided, and a gap for removing a trapezoidal or triangular rubber sheet portion cut off by the double blades is arranged between these anvils.

11. A cover rubber stamping device adapted for carrying out the method of manufacturing a tire according to any one of claims 4 to 7, comprising:

an extruder for extruding the rubber sheet through a die, a rolling machine consisting of a pair of truncated conical rollers arranged with their large-diameter sides and the small-diameter sides corresponding with each other, and a cutter for cutting off the rolled rubber sheet in the width direction.

12. A cover rubber stamping device according to claim 11, wherein said rolling machine is provided between the pair of truncated conical rollers with almost a uniform gap over the width direction.

13. A cover rubber stamping device according to claim 11 or 12,
wherein the large-diameter side of one of the truncated conical rollers is
arranged opposite to the outside in the radial direction of the annular band and
the small-diameter side of this roller to the inside in the radial direction of the
5 annular band in the stamping posture of the rubber sheet onto said annular
band.

14. A cover rubber stamping device according to any one of claims 11
to 13, wherein an opening of the die of the extruder is made into the slit state
whose width is gradually increased from one end to the other end, and the
10 wide side end of the opening is arranged corresponding to the large diameter
side of the truncated conical roller and the narrow side end of the opening
corresponding to the small diameter side of the truncated conical roller.

15. A tire in which at least one side wall is comprised of a first color
side wall rubber expressed as characters or lines, a second color side wall
rubbers located on both sides in the radial direction of this first color side wall
rubber, respectively, and a cover rubber in the second color covering a first-
color side wall rubber portion other than the characters or lines, wherein:

the first color side wall rubbers and their second color side wall rubber
are made of a continuous rubber ribbon wound in plural turns, respectively,
20 and the cover rubber is made of a single thin annular rubber sheet.

16. A method of stamping a rubber sheet member in the annular state
on a side face of a body of rotation, wherein:

a leading end of a long rubber sheet arranged on a tangent of an annular
band on the side face of the body of rotation to be a stamping face of the
25 rubber sheet member is held, and the leading end is transferred onto the
annular band and pressed and then, the rubber sheet is stamped onto the
annular band by rotating the body of rotation around its central axis while
applying a tension to this rubber sheet, after the rotation of the body of
rotation is stopped, an unstamped portion of the long rubber sheet is cut off,
30 and the unstamped portion to be the rear end of the rubber sheet on the
annular band is pressed onto the annular band to stamp the rubber sheet
member.

17. A method of stamping a rubber sheet member according to claim 16, wherein in cutting the long rubber sheet extending on said tangent so as to form the leading end and the rear end of said rubber sheet, both the cut-off faces of the leading end and the rear end of the rubber sheet are inclined with respect to the width direction of the long sheet, and the long rubber sheet is cut off so that, in the cut-off face of the rubber sheet leading end, the end in the width direction to be the outside in the radial direction on the annular band is located closer to the front in the traveling direction of the long sheet than the end in the width direction to be the inside in the radial direction, while in the cut-off face of the rubber sheet rear end, the end in the width direction to be the outside in the radial direction on the annular band is located closer to the rear in the traveling direction of the long sheet than the end in the width direction to be the inside in the radial direction, and

a rubber sheet portion in the shape of a trapezoid or a triangle defined by the cut-off face of the rear end of the rubber sheet stamped first and the cut-off face of the leading end of the rubber sheet to be stamped next is removed.

18. A method of stamping a rubber sheet member on a side face of a body of rotation in the annular state, wherein:

a rubber sheet extruded through a die is passed through a gap formed by arranging large-diameter sides and small-diameter sides of a pair of truncated conical rollers opposite to each other for rolling, and immediately after rolling of this rubber sheet, the rubber sheet is stamped in the annular state so that the rubber sheet side rolled by the large-diameter side of truncated conical roller is made to correspond with the outside in the radial direction of the side face of the body of rotation while the side rolled by the small-diameter side of truncated conical roller is made to correspond with the inside in the radial direction of the side face of the body of rotation.

19. A method of stamping a rubber sheet member according to claim 18, wherein said gap is made uniform over the width direction so as to roll the rubber sheet.

20. A method of stamping a rubber sheet member according to claim 18 or 19, wherein after the rolled rubber sheet is wound around one of the truncated conical rollers by a predetermined angle, the rubber sheet is

transferred from this truncated conical roller to the body of rotation while pressing the wound rubber sheet onto the body of rotation.

21. A method of stamping a rubber sheet member according to any one of claims 18 to 20, wherein the rubber sheet wound around said one of the truncated conical rollers is cut off in the width direction on this truncated conical roller.

22. A device used for the stamping method of a rubber sheet member according to claim 16 or 17, comprising:

a rubber sheet delivery means for delivering said long rubber sheet, a tensioner for applying a tension to the delivered long rubber sheet, a leading-end holding part for holding the leading end of the long rubber sheet, a leading-end holding part displacing means for displacing this leading-end holding part back and forth between a holding start position and a holding end position, a pressing roller for pressing the rubber sheet across the leading end to the rear end onto said annular band, a rubber sheet guide mechanism for regulating an entry position of the long rubber sheet into the annular band, and a cutter for forming the leading end and the rear end of the rubber sheet by cutting said long sheet.

23. A rubber sheet member stamping device according to claim 22, wherein said leading-end holding part is to hold the rubber sheet leading end by vacuum adsorption.

24. A rubber sheet member stamping device in claim 22 or 23, wherein double blades inclined in the reverse orientation from each other with respect to the face crossing the long rubber sheet delivery direction are disposed on said cutter, and anvils for receiving these blades and a cutter displacing means for displacing the cutter in the direction crossing the rubber sheet face arranged on the anvil are provided, and a gap for removing a trapezoidal or triangular rubber sheet portion left after cutting by the double blades is arranged between these anvils.

25. A device used for the stamping method of a rubber sheet member according to any one of claims 18 to 21, comprising:

an extruder for extruding a rubber sheet through a die, a rolling machine consisting of a pair of truncated conical rollers arranged with their large-

diameter sides and the small-diameter sides corresponding with each other, and a cutter for cutting off the rolled rubber sheet in the width direction.

26. A rubber sheet member stamping device according to claim 25, wherein said rolling machine is provided between the pair of truncated conical
5 rollers with almost a uniform gap over the width direction.

27. A rubber sheet member stamping device according to claim 25 or 26, wherein the large-diameter side of one of the truncated conical rollers is arranged opposite to the outside in the radial direction of the side face of the body of rotation and the small-diameter side of this roller to the inside in the
10 radial direction of the side face of the body of rotation in the winding posture of the rubber sheet onto the body of rotation.

28. A rubber sheet member stamping device according to any one of claims 25 to 27, wherein an opening of the die of the extruder is made into the slit state whose width is gradually increased from one end to the other end,
15 and the wide side end of the opening is arranged corresponding to the large diameter side of the truncated conical roller and the narrow side end of the opening corresponding to the small diameter side of the truncated conical roller.